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STRATEGIES FOR POLICIES ON WATER PROJECTS

TECHNICAL ASSISTANCE PROGRAM

Recommended Policy

930 E Lyndale Ave.
Helena, Montana 59601

The Technical Assistance Program should continue to provide assistance in evaluating the preliminary engineering, financial, economic, and legal feasibility of locally-sponsored water project proposals. Program guidelines for eligible projects should remain general so that sufficient flexibility is maintained to address a wide range of water projects. More effort could be directed at publicizing the program at the local level.

Implementation

There will be no new implementation needs for the Technical Assistance Program.

B. DAM SAFETY

Definition of Structures Subject to the Proposed Dam

Design Review Requirement

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IMPLEMENTATION STRATEGIES FOR POLICIES ON WATER PROJECTS

TECHNICAL ASSISTANCE PROGRAM

Recommended Policy

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Implementation

There will be no new implementation needs for the Technical Assistance Program.

B. DAM SAFETY

Definition of Structures Subject to the Proposed Dam

Design Review Requirement

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A design review requirement for dams which would be constructed in Montana has been suggested. The review would assure compliance of the dam design with standard safety criteria and would be conducted by personnel in DNRC's Dam Safety Section. A dam is defined as "any artificial barrier, including appurtenant works, used to impound or divert water and which is or will be greater than twenty-five (25) feet in height or with an impounding capacity of fifty (50) acre-feet or greater." Such a structure would automatically be subject to the dam design review requirement. In addition, DNRC would maintain the authority necessary to require such a review for a proposed water retention structure of any size where such a structure could threaten the safety of the public.

Recommended Policy

The DNRC should actively pursue the legislation necessary to obtain the authority and funding to implement the following:

- 1) An annual inspection program for state-owned dams.
- 2) A state-wide dam safety program for existing, non-Federal dams, both public and private.
- 3) A design review program for non-federal dams to assure compliance with standard safety criteria.

Implementation

Substantial changes in Montana's dam safety law and a budget increase for the DNRC's Dam Safety Section will be needed to implement the recommended policy. Draft legislation of a modified Montana dam safety law is presented in the following section. This legislation would provide the necessary legal authority to require a mandatory design review for proposed dams, an inspection program during construction of a dam, and periodic safety inspections of existing dams. All duties and responsibilities for dam safety presently assumed by the county attorneys would be transferred to DNRC under this proposed legislation. Following the proposed legislation, a very rough, non-itemized cost estimate is given for satisfying the major identified needs.

Proposed Montana Dam Safety Law

41-3-307. Definitions

(a) As used in this act unless the context otherwise requires:

(i) "Alterations" or "repairs" means only such alterations or repairs as may directly affect the safety of the dam or reservoir, as determined by the Department or its designated representative;

(ii) "Appurtenant works" include, but are not limited to, such structures as spillways, either in the dam or separate therefrom, the reservoir and its rim, low level outlet works, and water conduits such as tunnels, pipelines or penstocks, either through the dam or its abutments;

(iii) "Dam" means any artificial barrier, including appurtenant works, used to impound or divert water and which is or will be greater than twenty-five (25) feet in height or with an impounding capacity of fifty (50) acre-feet or greater;

(iv) "Days" used in establishing deadlines means calendar days, including Sundays and holidays;

(v) "Department" means Montana Department of Natural Resources and Conservation;

(vi) "Diversion system" means any canal, ditch or pipeline with a carrying capacity in excess of fifty (50) cubic feet of water per second of time;

(vii) "Emergency" means any threat to life or property caused by the condition of the dam, reservoir or diversion system, or by present or imminent floods which threaten the safety or structural integrity of any dam, reservoir or diversion system;

(viii) "Enlargement" means any change in or in addition to an existing dam or reservoir which raises or may raise the water storage elevation of the water, or increases the impoundment capacity of a reservoir;

(ix) "Inspection" means visual or mechanical checks, measures, boring, and any other methods necessary for determination of the adequacy of construction techniques, conformity of work with approved plans and

specifications, and the safety and operating performance of a dam or diversion system and appurtenant works;

(x) "Owner" includes any of the following who own, control, operate, maintain, manage or propose to construct a dam or reservoir:

(A) The state and its departments, institutions, agencies and political subdivisions;

(B) Every municipal or quasi-municipal corporation;

(C) Every public utility;

(D) Every district;

(E) Every person;

(F) The duly authorized agents, lessees or trustees of any of the foregoing;

(xi) "Person" means any person, firm, association, organization, partnership, business trust, corporation or company;

(xii) "Reservoir" means any basin which contains or will contain impounded water;

(xiii) "This act" means (41-3-307 to 41-3-317).

41-3-308. Plans to be prepared by professional engineer; approval of plans and specifications by the Department; industrial siting permits.

(a) Duplicate plans and specifications of any proposed construction, enlargement, repair, alteration or removal of dam or diversion system shall be prepared by or under the direction of a registered professional engineer licensed to practice in the State of Montana and experienced in dam design and construction, and shall be submitted to the Department for approval. It is unlawful to commence construction, enlargement, repair, alteration or removal until the plans and specifications have been approved by the Department. At the request of the Department, the professional engineer responsible for the plans and specifications shall carry out any revisions of the plans and specifications or provide such additional information as is necessary to justify or clarify the design.

(b) A copy of all plans and specifications submitted under this section shall be kept on file at the Department of Natural Resources and Conservation.

41-3-309. Inspections performed and reports submitted to the Department by professional engineer.

(a) A registered professional engineer licensed to practice in the State of Montana shall be in charge of and responsible for the construction, enlargement, repair, alteration or removal of any dam, reservoir or diversion system.

(b) The engineer in charge shall provide for inspections at such intervals as deemed necessary to insure conformity with the approved plans and specifications either by himself or by a person qualified to perform the inspections and for whose work the engineer stands personally responsible.

(c) All information obtained from, during or as the result of such inspection shall be made part of a report, certified to by the engineer in charge, which shall be submitted to the Department at such time or times as may be set by the Department.

(d) All reports submitted under this section shall be made a part of the permanent record on file at the Department of Natural Resources and Conservation.

41-3-310. Inspections by the Department; Cost

(a) If the Department believes that inspections carried out under 41-3-309 are inadequate or that additional inspections are necessary, the Department may inspect the construction, enlargement, repair, alteration or removal of any dam, reservoir or diversion system. If after any such inspection the Department finds that amendments, modifications or changes are necessary in order to insure the security and integrity of the work and structure the protection of property or public safety, the Department may order the owner or owners of the dam, reservoir or diversion system to revise the plans and specifications, or order work stopped. It is unlawful to proceed with or continue such work until any revisions have been approved by the Department.

(b) Any inspections required by this section shall be made at state expense provided the engineer performing such inspections is authorized by the Department and is an employee in the State of Montana.

(c) If the engineer is not a regular employee of the State of Montana, inspections shall be made at the expense of the owner. The owner shall be furnished with an estimate of the cost prior to performance of any inspections but the Department is not precluded from collecting any or all additional costs which result from performance of such inspections. Costs to be paid by the owner shall include, but are not limited to, such work or tests as are necessary to fully provide an information and data required by the Department or its appointed representative.

41-3-311. Periodic inspections.

(a) Any dam, reservoir or diversion system subject to the terms of this act which by virtue of its location and which in the opinion of the Department constitutes a hazard to life or a significant economic hazard shall be inspected at least once every five (5) years or as often as deemed necessary in order to insure the continued safety of such works or structure.

(b) Inspections referred to in subsection (a) of this section shall be performed by the Department or its appointed representative, and all information obtained as a result of such inspections shall be made a part of the permanent records of the Department.



(c) Inspections required under this section shall be made at state expense except as provided in (41-3-312) when a dam, reservoir, or diversion system is found to be unsafe by the Department.

41-3-312. Inspections at any time or at request of other party or parties; cost; limitation against unsafe structures.

(a) The Department may, or upon written request from any person or persons residing on or owning land near any dam, reservoir, or diversion system, shall order an inspection of such works at any time other than the time set for regular inspections as provided for in (41-3-311(a)).

(b) If the dam, reservoir or diversion system is found to be defective, the Department may require the person or persons owning the dam, reservoir or diversion system in question to pay the whole or any part of the expenses of inspection. If the Department requires such payment, it shall present a bill of costs to the owner or owners, and if the owner or owners refuse or neglect to pay the costs within thirty (30) days after the presentation of such bill of costs, the costs shall constitute a lien upon the works or other properties of the owner or owners and may be collected by appropriate action in any court of competent jurisdiction. If the inspection discloses defects in the works which in the judgment of the Department or its authorized agent constitute a menace to life or property, the Department may, without incurring any liability, order the draining of any reservoir involved, or the limitation or cessation of its use or the use of any defective works until such time as the owner of the reservoir or other works returns the works to a safe condition as approved by the Department.

41-3-313. Outlets; maintenance; draining by breaching.

(a) All dams, reservoirs, or diversion systems hereafter constructed, with or without a controlled inlet, shall contain an outlet controlled by a head gate or other control works. The head gate or control works shall be maintained in an operable condition at all times and in such manner that water impounded by or within a dam, reservoir or diversion system may be evacuated or maintained at any water level which may be required by the Department.

(b) All dams constructed prior to the effective date of this act which have no outlet or means for lowering the reservoir water level in an expeditious manner, may be drained by breaching at the owner's expense when the public safety so requires.

(c) The Department and anyone working under its direction and control shall not be held liable for any damages or loss of water resulting from the draining or imposed restrictions as to the use of a reservoir, pit or diversion system.

(d) If within thirty (30) days after presentation of an itemized statement the owner fails to reimburse the Department for expenses incurred under this section, any unpaid balance of such expense shall automatically constitute a lien upon lands or other properties of the owner.

41-3-314. Emergency repairs or breaching

(a) In case of an emergency where the Department or its authorized representative declares that repairs or breaching of a dam or diversion system are immediately necessary to safeguard life and property, the necessary repairs or breaching shall be started immediately by the owner or by the Department or its representative at the owners expense, if the owner fails to do so. The Department shall be notified at once of any proposed emergency repairs or breaching to be instituted by the owner.

(b) If emergency repairs have been made and the emergency situation has passed, the owner shall commence all repairs necessary to return the dam or diversion system to a safe and usable condition, as provided in 41-3-3-8 41-3-310.

(c) All costs incurred by the Department during an emergency shall be payable by the owner or owners on receipt of the bill of costs from the Department. Costs not paid within thirty (30) days after presentation of the bill shall constitute a lien upon the dam or diversion system or other properties of the owner or owners and may be collected by appropriate action in any court of competent jurisdiction.

41-3-315. Dams less than 25 feet in height or impounding less than 50 acre feet.

For any dam not defined in (41-3-307 (a) (iii)), being less than twenty-five (25) feet in height or with an impounding capacity less than fifty (50) acre-feet, located within or in the vicinity of an area of occasional or permanent occupancy, the Department may enforce any sections of this act in

such manner and by such means as may be necessary to insure the safety of the public and protection of property.

41-3-316. Actions brought against state, Department or employees prohibited.

(a) No action shall be brought against the state or the Department or any of its agents or employees for the recovery of damages caused by the partial or total failure of any dam or reservoir or damages caused by virtue of the operation of any dam or reservoir upon the ground that such defendants are liable by virtue of any of the following:

- (i) The approval of the dam or reservoir, or approval of flood handling plans during construction;
- (ii) The issuance or enforcement of orders relative to maintenance or operation of any dam or reservoir;
- (iii) Control and regulation of any dam or reservoir;
- (iv) Measures taken to protect against failure during an emergency; or
- (v) Failure to take an action required by the provisions of this act.

41-3-317. Liability of reservoir owners

Nothing in this act shall be construed to relieve an owner or owners of any reservoir, dam, or diversion system of any legal duties, obligations or liabilities incident to their ownership or operation of or any damages resulting from the leakage or overflow of water or for floods resulting from the failure or rupture of the fill or structure for such works.

41-3-318. Cancellation of permit for failure to comply with sections 41-3-308 to 41-3-310, 41-3-312 and 41-3-313.

Failure to comply with the provisions of (41-3-308 to 41-3-310), (41-3-312) and (41-3-313) shall subject the permit to cancellation at any time during the progress of the work. The Department is authorized to cancel any permit wherein the provisions of the above sections have not been, or are not being, complied with, and the cancellation shall operate as a forfeiture of all rights acquired under and by virtue of any permit theretofore approved by the Department.

Proposed Budget

Item: Inspection Program for state-owned dams:

Funding Source	FY 82	FY 83	FTE's
Project Ear-marked	\$40,000	\$40,000	1.0
Revenue Fund			

Item: State-wide dam safety program for existing, non-federal dams, both public and private.

Funding Source	FY 82	FY 83	FTE's
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General Fund \$120,000 \$135,000 3.0

Item: Dam design review program

Funding Source	FY 82	FY 83	FTE's
General Fund	\$150,000	\$175,000	3.5

*Funding for the inspection of state-owned dams will be included in the Water Development Program.

C. SPILLWAY REHABILITATION

Suggested Criteria for Determining Whether to Rehabilitate State-Owned Spillways

Before any action can be taken to make state dams safe a project specific assessment of alternatives must be conducted.

There are four economic, financial, and social measures which can be used to determine whether rehabilitation or breach option might be pursued. These are: 1) a standard benefit-cost ratio, 2) a benefit-cost ratio which includes only the benefits and costs to Montana, 3) a financial analysis, and 4) intangible benefits and costs.

A standard benefit-cost ratio is one which calculates and compares direct project benefits and costs. Direct benefits denote the value obtained from project-produced goods and services. For instance, increases in farm income as a result of irrigation, the value of electric power, and the satisfaction a recreationist derives from reservoir use are all direct benefits. Direct project costs include such items as construction costs, engineering and administrative costs, right-of-way costs, and relocation costs.

The standard B-C ratio calculated for rehabilitation of state dams will concentrate on evaluating the existing benefits which would be continued if the project were rehabilitated. On some projects additional water or hydropower may be produced which would result in the rehabilitation option having benefits greater than the original project.

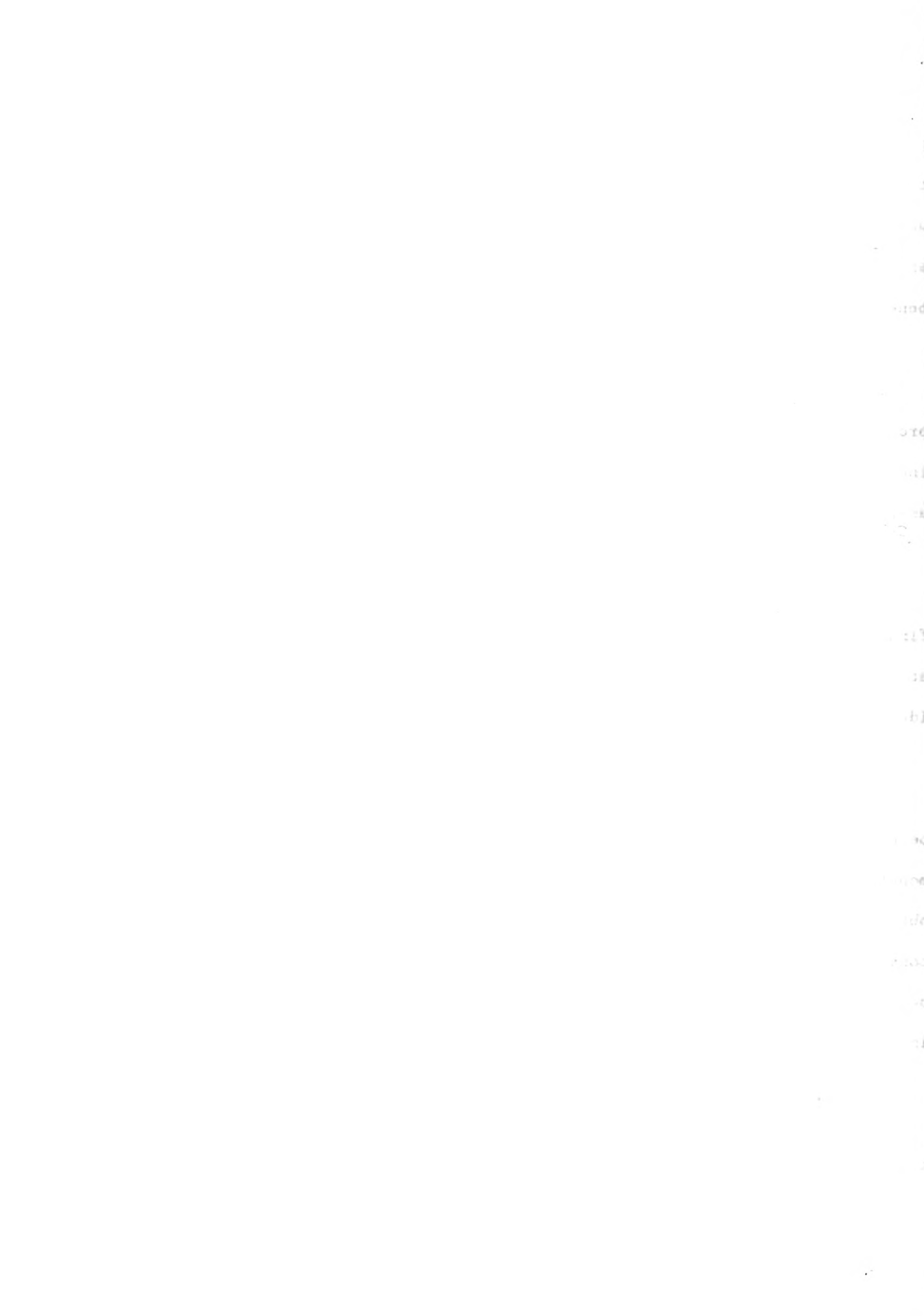
The second economic measure is a benefit-cost ratio which calculates the project benefits and costs to Montanans. This B-C analysis would differ from the standard B-C ratio in several respects. First, any federal loan or grant which would be extended to rehabilitate a state dam would be included in the analysis. Federal aid would lower costs to Montana. Second, indirect benefits and costs would be included in the B-C ratio.

Indirect benefits and costs are measures of the economic impact of a project in the communities affected by the project. They result from increased local spending during construction and increased spending by water users during project operation.

The third analysis of a rehabilitation option is a financial analysis. A financial analysis will detail the cost and revenue flows in the amount and at the time they occur. The sources of payment for a project option will be identified in the financial analysis.

Finally, intangible benefits and costs must be identified. Intangible benefits and costs are project characteristics which cannot be assigned a monetary value. In the case of the Tongue River Project the benefit of obtaining a settlement with the Northern Cheyenne on water rights would be considered valuable, although the actual dollar amount of this benefit would be difficult to quantify. Conversely the environmental impacts are often intangible costs.

The decision to rehabilitate or breach a dam will hinge on a consideration of the Montana b-c ratio, financial analysis, and intangible



benefits and costs of a given option. If a rehabilitation option has a Montana b-c ratio greater than 1 the DNRC will propose to the legislature that the option be pursued. If the preferred rehabilitation option has a b-c ratio less than 1, but a strong case can be made that the intangible benefits of rehabilitation outweigh the net economic costs then the DNRC will propose that the option be pursued. If all rehabilitation options for a given dam have Montana b-c ratios less than 1 and the intangible benefits do not provide sufficient justification to rehabilitate a state dam, DNRC will recommend that the dam be breached.

Recommended Policy

The Department should pursue a policy which seeks to keep existing state-owned dams in place, recognizing that the quantifiable cost to rehabilitate such dams will usually outweigh the quantifiable benefits associated with rehabilitation.

Implementation

Implementation of the above policy would be accomplished as part of the proposed Water Development Program.

As an initial step, a numerical ranking of all state-owned dams will be formulated, based on the hazard and safety condition of those dams. The ranking will indicate the dams in most urgent need of repair and will be

prepared by DNRC's Engineering Bureau. The most recent ranking is shown on page 8 of the Water Development Program paper.

Emergency warning and evacuation plans will be prepared for each dam. These plans will contain the procedures to be followed should failure of a dam appear imminent. Such a plan would list the proper authorities to notify, outline evacuation procedures, and indicate the operation restrictions to be placed on the dam. Emergency preparedness plans would be developed for each dam during the first two years of a project rehabilitation program.

Next, a determination must be made on whether a given dam project should be rehabilitated or breached. This necessitates an evaluation of the unique situation presented by each individual project, taking into account the economic, financial and intangible factors identified previously. Within this analysis, it will often become apparent that there are a number of spillway rehabilitation schemes which should be addressed. Should breaching be the preferred option, it is anticipated that the dam project would first be offered for sale to the water users, with the Board of Natural Resources determining the price and conditions of the sale.

Following the economic-financial assessment, efforts will be directed toward securing the necessary financing to complete the selected alternative. Possible sources of funding include a loan such as a small Reclamation Projects (PL-984) Loan, Federal or State grants, and sales of additional water.



Once a decision is made to rehabilitate a project and the necessary financing is secured, the design phase can begin. The design phase includes completing a detailed design, developing the construction drawings and specifications, obtaining the necessary permits and purchasing additional and/or easements where needed. Construction would then follow.

A more detailed description of the process by which state-owned dams would be upgraded to current design standards is given in the Water Development Program paper.

The Department proposes to complete the repairs on all the projects within the next 20 to 25 years. The estimated cost for each project is given in the Water Development Program paper. Approximately three to five years will be required to rehabilitate each of the projects which contain a dam. However, this time frame may be extended if unusual problems are encountered.

Two to three years will be needed to complete the feasibility assessment, securing of the necessary financing, and formulation of a detailed plan for each dam. It will be necessary to start two to three projects per year to complete the rehabilitation of all projects in 20-25 years. Several projects will be in various phases of rehabilitation at the same time.

The majority of technical work will be contracted out to engineering consultants. DNRC's responsibility will be to oversee the consultants, obtain the permits, and negotiate contracts.



Budget Estimate

To implement the proposed spillway rehabilitation program, approximately \$663,000 will be needed to fund four to six federal loan applications to rehabilitate state-owned dams and the development of downstream emergency warning and evacuation plans for all state dams. An additional \$80,000 will be needed to finance safety inspections for state-owned dams.

D. DISPOSITION OF STATE-OWNED CANALS

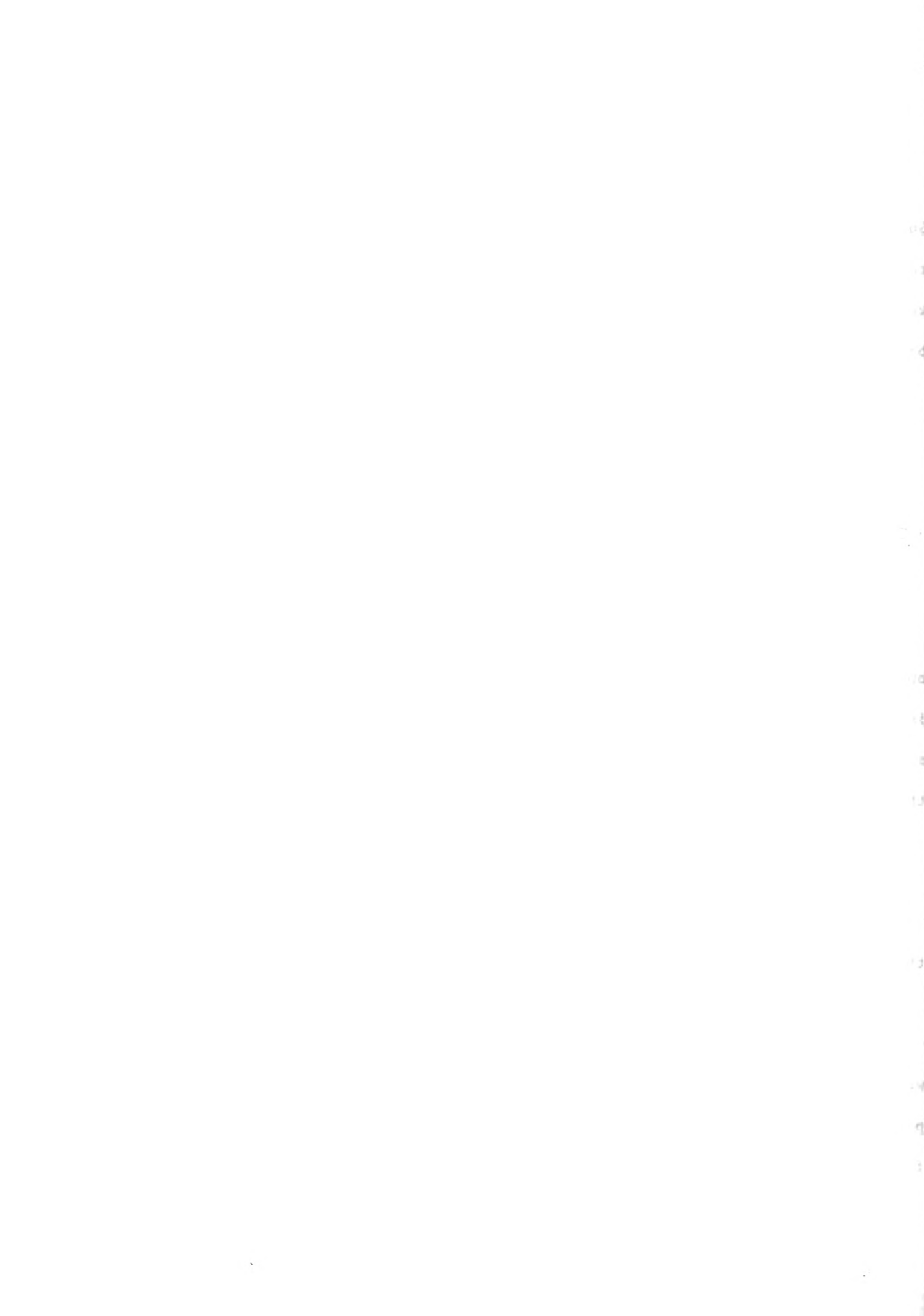
Recommended Policy

The state should seek to dispose of state-owned canal projects that can operate on their own without assistance from state government. In the interim period before canal ownership is officially transferred, an effort should be made to encourage the water users to assume a greater proportion of the financial responsibilities of operating such projects.

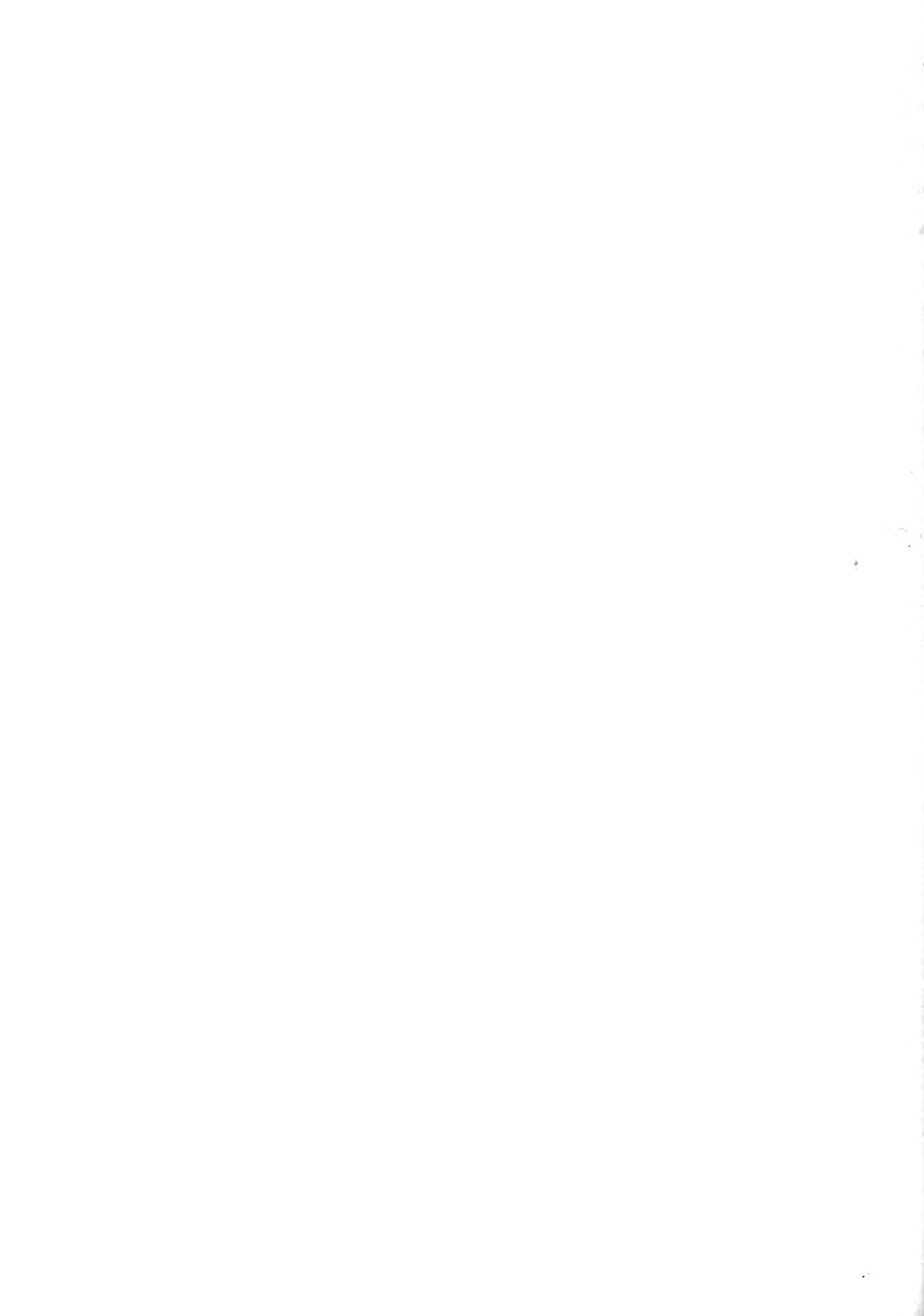
Implementation

Neither new legislation nor additional funds will be needed to carry out the above policy.

DNRC's Projects Section would, within the next year, take steps to charge water users for the services provided by the state in administering each project. Within the limits of Projects Section staff time, DNRC will take full advantage of opportunities to transfer ownership of the canals should



users show a willingness to assume this responsibility. DNRC will also search for other creative means of disposing of these projects. A report describing more specifically the actions taken to dispose of canal projects will be prepared for review by the legislature in late 1982.



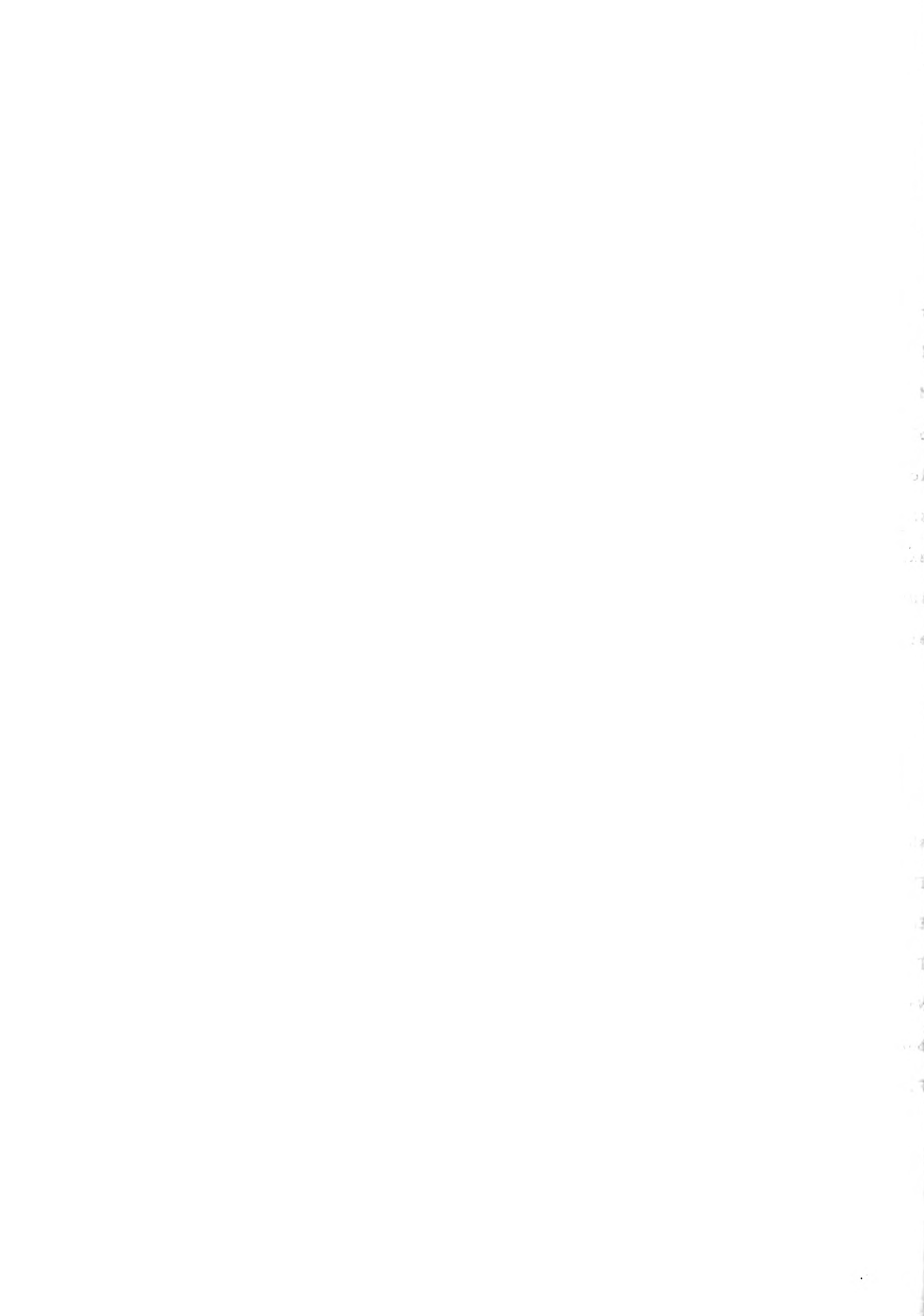
FLOODPLAIN MANAGEMENT

Recommended Policy

The Floodplain Management Section should continue to fulfill its present roles and responsibilities as the state coordinator for the National Flood Insurance Program and as the primary means of promoting compliance with the Montana Floodplain and Floodway Management Act. More emphasis should be placed on informing and educating the general public, community officials and local floodplain administrators. These information-education activities should be directed at justifying floodplain management concepts in general, explaining how the various floodplain management programs work and providing information on the progress and effectiveness of local floodplain management efforts.

Implementation

No new legislation will be required to implement the above policy nor should any additional appropriations be needed from the state legislature. The DNRC is relatively confident that it will receive from the Federal Emergency Management Agency approximately \$43,000 in state assistance funds. This money will be used to help support Montana's participation in the National Flood Insurance Program during Federal fiscal year 1981. It has been indicated that a similar amount will be forthcoming during Federal Fiscal Year 1982.



The primary goals to be accomplished under the State Assistance Program include:

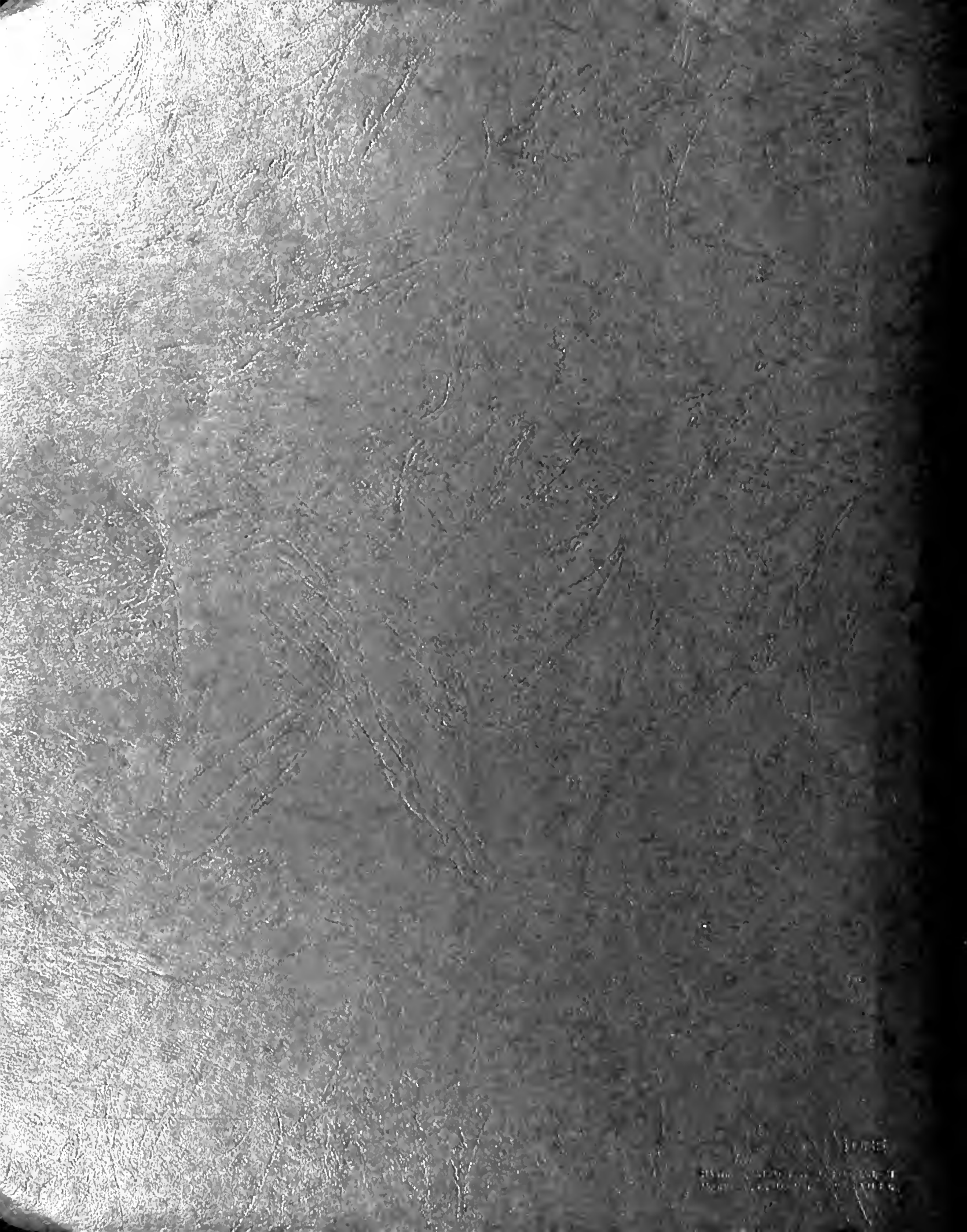
- Coordination of available floodplain information and data for general distribution

- Development of educational materials designed for local governmental officials, state and federal agencies, and various professional organizations

- Promoting media coverage of important aspects of the National Flood Insurance Program

- Furthering commitments by the state in defining goals and objectives of floodplain management.

With these funds, the DNRC intends to hire one FTE to act as a Program Coordinator and a one-half time FTE to fill a clerical-technical position. Both employees will be supervised by the head of the Floodplain Management Section.



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